

Course Code	Course Name	Credits
26ZY008	EVOLUTION	04

Course Objectives

- To understand the origin and evolution of life on Earth.
- To study the theories, mechanisms, and evidences of evolution.
- To gain knowledge about speciation, adaptation, and natural selection.
- To understand the evolutionary relationships among organisms.
- To develop analytical skills in interpreting evolutionary processes and patterns

Learning Outcomes

- Explain the major theories and evidences supporting evolution.
- Demonstrate knowledge of evolutionary mechanisms and speciation.
- Analyze the role of natural selection, mutation, and genetic variation in evolution.
- Apply evolutionary principles to understand biodiversity and adaptation.
- Evaluate the evolutionary relationships and origin of different organisms.

Unit 1 – Origin of Life and Evidences of Evolution (12 Hrs.)

Origin of life; Biogenesis; Oparin and Haldane theory; Miller–Urey experiment; origin of prokaryotic and eukaryotic cells; geological time scale and divisions of geological eras (Precambrian, Paleozoic, Mesozoic and Cenozoic eras); major evolutionary events and mass extinctions in geological history.

Unit 2 – Theories and Mechanisms of Evolution (12 Hrs.)

Lamarckism and inheritance of acquired characters; Darwinism and theory of natural selection; voyage of Charles Darwin and observations on Darwin’s finches; adaptive radiation and significance of finch beak variations; Neo-Darwinism and synthetic theory of evolution; mutation theory of Hugo de Vries; convergent and divergent evolution.

Unit 3 - Variation, Adaptation and Natural Selection (12 Hrs.)

Definition and types of variations; sources of variation such as mutation, recombination and genetic changes; role of variation in evolution; adaptation and adaptive significance; natural selection and survival of the fittest; mimicry and camouflage; convergent and divergent evolution; co-evolution; struggle for existence and evolutionary fitness.

Unit 4 – Population Genetics and Speciation (12 Hrs.)

Gene pool and gene frequency; Hardy-Weinberg principle and genetic equilibrium. Factors affecting Hardy–Weinberg equilibrium such as mutation, migration, natural selection, genetic drift and recombination; founder effect and bottleneck effect; reproductive isolation and isolating mechanisms; types of speciation including allopatric, sympatric and parapatric speciation; role of genetic variation in evolution.

Unit 5 - Human Evolution (12 Hrs.)

Origin and evolution of humans; fossil records and evidences for human evolution; evolution of primates; characteristics of early human ancestors; Australopithecus, Homo habilis, Homo erectus, Neanderthals and Homo sapiens; biological and cultural evolution in humans; evolution of intelligence, language and social behavior.

Reference Books:

1. Ridley, M. (2004). Evolution. Blackwell Publishing.
2. Futuyma, D.J. (2013). Evolution. Sinauer Associates.
3. Strickberger, M.W. (2008). Evolution. Jones and Bartlett Publishers.
4. Dobzhansky, T. (1970). Genetics and the Origin of Species. Columbia University Press.
5. Rastogi, V.B. (2019). Organic Evolution. Kedarnath Ram Nath Publishers.

Websites and eLearning Sources:

<https://evolution.berkeley.edu>

<https://www.biologydiscussion.com/evolution>

<https://www.easybiologyclass.com/category/evolution/>